ENCOURAGING THE USE OF RESIDENTIAL SMOKE DETECTORS

LEADING COMMUNITY RISK REDUCTION

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Abstract

The Rexburg-Madison County Emergency Services (RMCES), in Idaho, lacks a formalized program to help the families in the City of Rexburg and Madison County to understand the importance of smoke detectors in their homes. The purpose of this research paper was to identify programs that could be implemented by the RMCES to enhance use of smoke detectors in residential occupancies.

This was a descriptive research project. This research project applies to the course just taken at the National Fire Academy, 'Leading Community Risk Reduction' (NFA, 1998). The research questions to be answered were:

1. What are the benefits of having smoke detectors in a single family dwelling, and what are the present code requirements in the 2000 International Residential Code?
2. What type of programs have other jurisdictions used to successfully place detectors in homes?
3. What program elements would enhance the use of smoke detectors in single family dwellings?

The procedures involved were literature review, code review, and research of programs from other departments. The literature materials were taken from fire publications and state and federal data books. Programs of other departments were received from classmates and off the Internet.

The results of the literature review showed there were benefits of smoke detectors in single family dwellings, as well as the code requirements. Programs,

from the departments looked at, had many elements to use in a smoke detector program.

It is the recommendation of the author that the RMCES organize a committee to research and develop a smoke detector program, to assist the citizens of Madison County to protect themselves from fire.

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Introduction

The Rexburg-Madison County Emergency Services (RMCES), in Idaho, lacks a formalized program to help the families in the City of Rexburg and Madison County to understand the importance of smoke detectors in their homes. The purpose of this research paper will be to identify programs that could be implemented by the RMCES to enhance use of smoke detectors in residential occupancies.

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Background and Significance

A few years ago, the Rexburg-Madison County fire chief received a phone call from a family in Madison County saying they had just moved into a trailer home and did not have a smoke detector in their home. They were in a low income bracket and felt that they could not pay for a detector, but felt that smoke detectors were important to have in the home. They wanted to know if the department had a program to get the detector in their home, free of charge. The fire chief did not want

to turn them away and personally went out and bought two detectors and took them to the home, installing them himself, for this family. A couple years later this family moved to another trailer home and wanted to take these detectors with them. They called the station to see if we could come and take the detectors down and replace them in the new home. We sent a fireman out to do this project for them. Each year we receive calls from people wanting to know where they can get smoke detectors, what kind is best, and how to install them correctly.

In 1996 a house fire killed six children. There was no detector in the home at the time of the fire. We will never know if a working smoke detector in the home would have warned them early enough to get out safely. "The greater use of smoke alarms is thought to account for a significant part of the decrease in reported fires and deaths" (National Fire Data Center, 2001, p.14).

The cost of a smoke detector and batteries is not that high if you are buying a couple, but if you had to buy a few hundred it would be quite an expense. The Rexburg-Madison County Emergency Services would be unable to buy hundreds of detectors, from their budget, for the patrons of the County. The RMCES department would like to create a program to help the community understand the importance of having a working smoke detector in the home, that the United States Fire Administration's operational objective relates, to "reduce the loss of life from fire in the age group of 14 years and below, and to reduce the loss of life from fire in the age group 65 years old and above" (National Fire Academy, 2002-2003).

Literature Review

Residential smoke detectors, are “Possibly the single most important piece of fire safety technology ever introduced … cheap, relatively easy to install and they have proved to be the most effective way of reducing fire deaths and injuries…” (Lynch, 2002, p. 13).

Each year there are more and more residences being protected by smoke detectors.

> In 1976, less than 10 percent of all homes had a smoke detector, while in 1986, nearly 80 percent did. Over the next 14 years the increase in the number of protected homes slowed dramatically, so that today slightly over 90 percent of all homes have a smoke detector. (Pehrson, 2000, pg.12).

Smoke detectors are inexpensive and easy to install, so why don’t all homes have at least one working detector in them? “Your chances of dying in a residential fire without a working smoke detector is 7.6 times greater than dying in a residence with a working detector” (Idaho State Fire Marshal, 2002, p 22). In this report, from the State Fire Marshal, the data received from fire departments, uses the National Fire Incident Reporting System (NFIRS), to record fire incidents and activities throughout the state. In this report, there is a section about smoke detectors and the functioning of smoke detectors in a fire. It was reported that in 2002, the number of detectors that were present in structure fires, statewide, were 329 Yes, 503 No, 209 Unknown, and 109 were left blank. Of the alarms that were present in the homes,18.2% failed to operate, 14.0% the fire was too small to activate, 52.6% operated, 14.9% were undetermined, and 0.3% of the reports were left blank. Of the

alarms that were present and operating, 57.8% alerted the occupants, 2.3% failed to alert the occupants, 11.6% had no occupants, 0.6% the occupants failed to respond, and 27.7% were undetermined. The last chart was about a detector that was present but failed, 8.3% were from a battery that was dead; 23.3%, the battery was missing; 1.7%, the detector was defective; 8.3%, the hardwired power failed; 1.7% was from lack of cleaning, and 56.7% was undetermined (see Appendix A).

> During 2002, fewer homes with detectors were involved in fires than 2001. Detectors were present in over a fourth of the fires. Almost half of all homes involved in fires did not have a detector. In those homes with detectors, over half operated, alerting the occupants 58% of the time. (Idaho State Fire Marshal, 2003, p.22)

These statistics show there is a need in the State of Idaho to teach home owners the importance of having a working smoke detector in their homes, to check them monthly, and replace the batteries yearly.

Code requirements for residential smoke detectors, in our county, come from the 2000 International Residential Code. This code states there are three primary locations where smoke detectors should be located in each residence. "1…in each sleeping room. 2. Outside of each separate sleeping area in the immediate vicinity of the bedrooms. 3. On each additional story of the dwelling…" (ICC 2000, p.49). When more than one detector is required in a dwelling, the code states these devices should be interconnected, so when one device sounds an alarm the other detectors in the residence would be activated also, warning occupants in other areas of the building.

During our course on Leading Community Risk Reduction, October 2003, at the National Fire Academy, we were asked to bring a presentation on our local department's innovative approach to a unique aspect of a community risk reduction program. There were two presentations on smoke detector programs that had been created in their respective their departments.

The first report was given by Gary Parker from the Fort Worth, Texas, Fire Department, in which they have a smoke detector inspection, installation, and maintenance program. Mr. Parker reported that whenever a member of the fire department comes in contact with a citizen in their home, "regardless of function or reason…they must check to see if a smoke detector is present, that it is in the correct location, and they have the proper quantity" (Gary Parker, personal communication, October 2003). With this information they will then add detectors, if needed, or place a new one in the home. They test an existing detector's performance, replacing batteries if needed, and then brief the occupant on operation of detectors. The main goal was to have a working smoke detector in the home before they left. He reported that every fire department vehicle has a smoke detector kit in them, which contains several smoke detectors, tools to install the detectors, and extra batteries. Mr. Parker said that the Fort Worth Fire Department feels they have had a decrease of fire incidents in residences with working detectors. This program is so important to the fire department that the only activities that supercede a call for a detector would be an emergency call.

The other report given in class was from Greg Peterson of the Roseville, Minnesota, Fire Department. Their department has a two part program. First, is a

joint venture with Dominos Pizza. Dominos Pizza will pick one of their orders, call the fire department to meet them at the address, and then the fire crew explains to the home owner what is going on and asks for permission to enter the home and check their detectors. The crew spends the needed time to check for location and functionality of the detector(s), replacing batteries, and installing new detectors as needed. The pizza is then given to the owner free of charge. In a personal communication with Mr. Peterson, he said the Roseville Fire Department feels that this program has generated a lot of good public relations for their department and for Dominos. The second part of their program he added "is based solely on doing the right thing at the time" They will also check people's smoke detectors and batteries as needed (G. Peterson, personal communication, November 29, 2003).

I sent out an e-mail to my classmates asking if their department has a smoke detector program and I received five responses, five saying yes and one saying no. The Schenectady New York Fire Department responded in the affirmative, saying they "have entered into a partnership with a local church and an HMO. These groups will buy smoke detectors, and we have them in stock here at the main fire station. Any citizen who stops is given a smoke detector, free of charge" (S. Doherty, personal communication, December 2, 2003). All the vehicles in their department carry a supply of detectors, and have asked their crews to look for at least one working detector on each floor of every building to which they respond.

In an e-mail from another class member with the Clearwater Fire & Rescue, in Florida, he said "We had a door-to-door program many years ago, but today we have scaled that back to basically installing detectors for free when people call and

request" (T. Welker, personal communication, November 26, 2003). He told me if I needed more information to check their web site at http://www.myclearwater.com/gov/depts/fire/support_services/training.asp#smokedetector.

By doing a search on the Internet, we find many different programs that fire departments have come up with. Many are similar to these presented, while others have residents fill out a form and send into the department to receive a detector.

In the Newhaven, Indiana Fire Department, their program is to give a free detector to anyone within the county that cannot afford one. They also install the detector for them and do a home safety survey if requested.

Some of the fire departments had the support and help from the American Red Cross, Kiwanis Club, the Lion's Club, Boy Scouts of America, and church groups get detectors into the homes. Most of these clubs will provide the detectors and batteries only. Others will help install the detectors.

The U.S. Department of Health and Human Services (1996) complied an inventory of smoke detector programs throughout the United States. In the introduction they state, "One of the most effective ways to prevent deaths and injuries from fires is to install and maintain smoke detectors in households" (p. 1).

The benefit of a program for getting smoke detectors in the home comes from an article out of the Davis County Clipper, Bountiful, Utah. Staff writer, Melinda Williams (2003) said,

A local couple is crediting the Bountiful City Fire Department with saving their lives and their home.

> The couple's home of 35 years caught on fire Sunday night, but they were able to escape without harm and save the house because a firefighter came around two months ago and gave the homeowner smoke detectors. (p. A3)

For more than a year the Bountiful Fire Department has been distributing free detectors to the homes within the city.

Procedures

The research procedures used in this paper included literature review and a survey.

Having a working smoke detector in every home has been on my mind for several years. When the innovative approaches to smoke detectors programs were presented in class, this seemed to be the right way to proceed.

While I was at the National Fire Academy in October 2003, I spent time in the library searching out articles on the topic of smoke detectors. I tried to limit articles to those written within the last five years, to get the most recent reviews on the subject. There were many articles on smoke detectors in multiple dwellings and rentals, but I wanted to stay more with single family dwellings. I several articles to review.

When I returned home I wrote a pre-proposal, then sent it to my evaluator for his approval. He gave me some changes to look at, and then I started to write the introduction of this paper.

I wanted to survey the community to see how many had smoke detectors in their homes, if they were serviced regularly, and if there was a need to get free detectors to the home owners (see Appendix B). To get these surveys out and back in time to

write this paper I would have to get right on the task at hand. Since I work with the Boy Scouts of America in the area, I thought a scout might like to do this survey as an Eagle Project. Inasmuch as the scouting district in Madison County is made up of six Zones, I checked with the leaders of these Zones to see if they had a boy that would like to take this project on. I did not get a taker so had to come up with another distribution method. So I approached the Zones in another way by giving 100 surveys to each of the Zone leaders and have them distribute 20 surveys to five Scout troops within their Zone. I asked the troops to randomly send boys out, to homes in their area, and have the home owner take the survey while the scout waited for the survey and then bring it back to the leaders. When done, the leader would then return the surveys to the Zone leader who would call me and I would pick them up. It sounded easy to do, but one of the Zones would not help with the project, thus we could only get 500 surveys out to the community and had one area not represented in the survey.

At the bottom of the survey was placed an optional question, for anyone that might need a detector, to get the name of anyone needing a detector in their home. There were some that gave their names and the RMCES will try to get a detector to these people first.

Two of the innovative approaches, which were given in our Leading Community Risk Reduction class, were used in the literature review as well as response to an e-mail sent to each of my class peers. The use of the Internet was also used by doing a search on Yahoo's search engine to find smoke detector programs across the

nation. With this search we had over 200 hits; some were legitimate sites while others were not.

Limitations

With the changes in fire and building codes every few years, I decided to keep the literature reviewed to within the past five years. I felt this would keep the information received, from these articles, current and more useful for this paper.

The survey used was limited to 600 surveys, 100 in six zones, to make it easier to get them out and get them returned within the six month time period. The 600 surveys also represented 8% of the total single family dwellings within the County. Also, the cost would have been prohibitive for me to have done more.

The Scouts were asked to randomly take the surveys out. There was no control put on them as to which home they should go to.

Results

As we reviewed the State of Idaho Fire Marshal's statistical report, the data shows that having a working smoke detector is a benefit in any home, when they reported our chances of dying in a fire is 7.6 times greater if we don't have a working smoke detector in the home. This, along with the literature reviewed, helps us understand the benefits of having a working detector in the home. Every year there are more residences being protected by smoke detectors with today being over 90% of the homes protected. Statistics showed that the loss of life and property are down if a detector is present (see Appendix A).

From review of the 2000 International Residential Code we found out how many smoke detectors are required in the home and where they need to be placed.

Of the 500 surveys that were sent out we received back 235 or 47% of the surveys. I felt that this number should have been higher, but statistically this is a good outcome. The first question on the survey was 'how many working smoke detectors are in your house?' From this question we had a median of two detectors per home with an average of 2.61 detectors in each home. The sad part of this question was that 28 of the homes surveyed did not have a detector in the home (see Appendix C, Chart 1). In the second question we asked them when the last time they checked their detector to see if it worked. We received answers such as "NEVER" to within the last few weeks. Some said "The last time they burned the food." At least there was a sense of humor with the survey (see Appendix C, Chart 2)! With question three, we wanted to see when the last time they changed their batteries. Again we had answers from "never" to "within the last few weeks" (see Appendix C, Chart 3). Some said their detectors were hardwired and did not have batteries. Question four was a way to see if people understood that their detectors would not last forever. The average age of the detectors had a median of five with an average of 7.38% years old. There were quite a few that were just purchased within the last month though the ones that were a concern were those that were older than 25 years or they did not know (see Appendix C, Chart 4).

With the next three questions I wanted to see the importance of a program to get detectors in the home. One question "having a working smoke detector in my home is: Extremely important, Very important, Somewhat important, or Not important." The other two questions, "Getting a free smoke detector installed in my house would be:" and "Being taught about the importance of smoke detectors is:" had the same

answers as the fifth question. Having a working smoke detector in their homes was extremely important to them while getting a free detector was not important. Most felt it was “very important” to be taught about the importance of a detector. The last two questions were to see if they owned or rented the homes they lived in and to find the age category of the people polled. Most that were surveyed owned their own homes. In the age category, to determine the number of people living in the home, of 0-14 there were 312 people, while in the larger section of 15-64 there were 582 people. The last category age of 64 an older, there were 42, with only six that were disabled in any of the groups.

Every year the Idaho State Fire Marshal’s office sends out a report summary of fires and fire activities within the state. This report, from the state, showed the benefits of smoke detectors in greater detail and was of great use in the literature review.

We have also looked at a few programs that other departments have come up with to get detectors in the homes of their citizens. There are many ways to advertise these programs to the public. Some were very simple and others took a little more work and help from other organizations and groups.

Discussion

Helping the home owner learn and understand the importance of smoke detectors is vital to getting a detector in every home as well as maintaining them once they are installed.

There is a need to educate the community on the need for working smoke detectors in the home. From our survey we found we are not quite up to the national

number of 90% of homes being protected by detectors, with ours being only 87.5%. The City of Rexburg is using the 2000 International Residential Code for all new buildings within the city. This will mean that our concentration would need to be on homes older than five years. To help us get detectors in these homes, the use of a program, such as those presented in this paper would need to be created and implemented. Some of the elements and ideas of these programs could be used to help create the program.

Creating a program to encourage the use of smoke detectors in the home would require a person or committee to review and create a program that would work with the department as well as the community.

Recommendations

Based on the literature reviewed, the fire reports of the State of Idaho, the code requirements, and the survey conducted, a need to educate the community to the use and maintenance of smoke detectors in their homes is of great need within Madison County. There are programs from other fire departments across the nation that can be used as a model for a program that would work within Madison County.

It is the recommendation of the author that the Rexburg-Madison County Emergency Services put together a committee to develop a program to educate the community about smoke detectors and get smoke detectors into the homes of Madison County citizens.

There is a need for further research of existing programs, by talking to other departments, by using the Internet, and the booklet *Efforts to Increase Smoke Detector Use in U.S. Households,* to help create a program that will benefit the

community. Items within this program that need to be researched would be: how to educate the public to smoke detector use; acquiring smoke detectors to give out; getting the detectors into the homes; and maintenance of the detector once they are installed.

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Appendix A

Smoke and Heat Detector Use

Detector Present	#	%	Civ Inj	Civ Fatal	FS Fatal	$Loss	#Bldg	#Res	#Acres
Yes	329	28.70%	20	3	0	$6,435,359	225	1,542	0
No	503	43.80%	19	2	0	$11,611,130	296	478	2
Unknown	209	18.20%	8	3	0	$4,877,190	186	256	0
(blank)	107	9.30%	0	0	0	$572.15	63	174	6
Grand Total	1148	100.00%	8	8	0	$23,495,729	770	2,450	8

If present, how did they operate?

Detector Operating	#	%	Civ Inj	Civ Fatal	FS Fatal	$Loss	#Bldg	#Res	#Acres
Failed to operate	60	18.20%	6	2	0	$1,305,850	40	261	0
Fire too small to operate	46	14.20%	0	0	0	$161,901	21	203	0
Operated	173	52.60%	9	0	0	$4,050,348	128	951	0
Undetermined	49	14.90%	5	1	0	$802.16	35	126	0
(blank)	1	0.30%	0	0	0	$115,000	1	1	0
Grand Total	329	100.00%	20	3	0	$6,435,259	225	1,542	0

If present and operating, what effect did it have?

Detector Effective	#	%	Civ Inj	Civ Fatal	FS Fatal	$Loss	#Bldg	#Res	#Acres
Alerted Occupants	100	57.80%	9	0	0	$1,863,725	89	689	0
Failed to alert occupants	4	2.30%	0	0	0	$20,000	4	9	0
No occupants	20	11.60%	0	0	0	$659,500	19	37	0
Occupants failed to respond	1	0.60%	0	0	0	$500	1	100	0
Undetermined	48	27.70%	0	0	0	$1,506,623	15	116	0
Grand Total	173	100%	9	0	0	$4,050,348	128	951	0

If present and failed to operate, what was the reason

Detector Failed	#	%	Civ Inj	Civ Fatal	FS Fatal	$Loss	#Bldg	#Res	#Acres
Battery discharged/dead	5	8.30%	0	0	0	$107,500	5	6	0
Battery missing/discon	14	23.30%	3	2	0	$188,700	12	12	0
Defective	1	1.70%	0	0	0	$400	0	0	0
Hardwired power failure	5	8.30%	0	0	0	$123,650	4	4	0
Lack of cleaning	1	1.70%	0	0	0	$2,400	1	1	0
Undetermined	34	56.70%	3	0	0	$883,200	18	18	0
Grand Total	60	100%	6	2	0	$1,305,850	40	40	0

Appendix B

Smoke Detector Survey

To be completed by head of the household.

1. How many working smoke detectors (SD) are in your house?

_____

2. When was the last time you checked your SD to see if it works?

_____

3. When was the last time you changed the battery(ies)?

_____

4. How old is your SD? _____

5. Having a working SD in my home is:

___ Extremely important ___ Very important ___ Somewhat important ___ Not important

6. Getting a FREE SD installed in my house would be:

___ Extremely important ___ Very important ___ Somewhat important ___ Not important

7. Being taught about the importance of SD is:

___ Extremely important ___ Very important ___ Somewhat important ___ Not important

8. I own ___ or rent ___. If you rent, does your landlord provide a SD for your place? _____

9. How many live in your house in age groups:
___ 0-14 ___ 15-64 ___ 65 and older ___ with disabilities

My age is: _____ My gender is: M F

Optional if you would like a detector placed in your home.

Name: _____

Address: _____

Appendix C

Chart 1

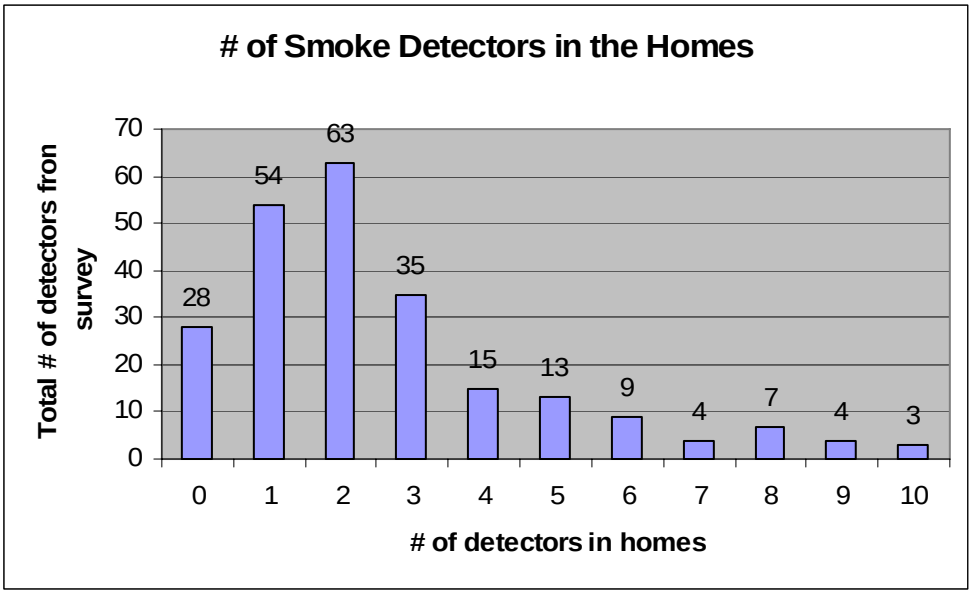

Chart 2

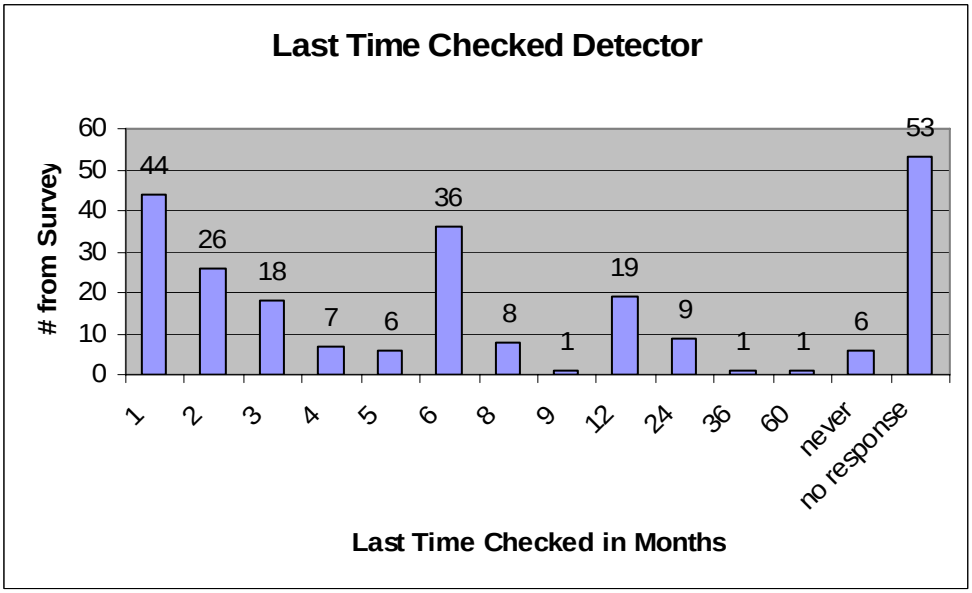

Chart 3

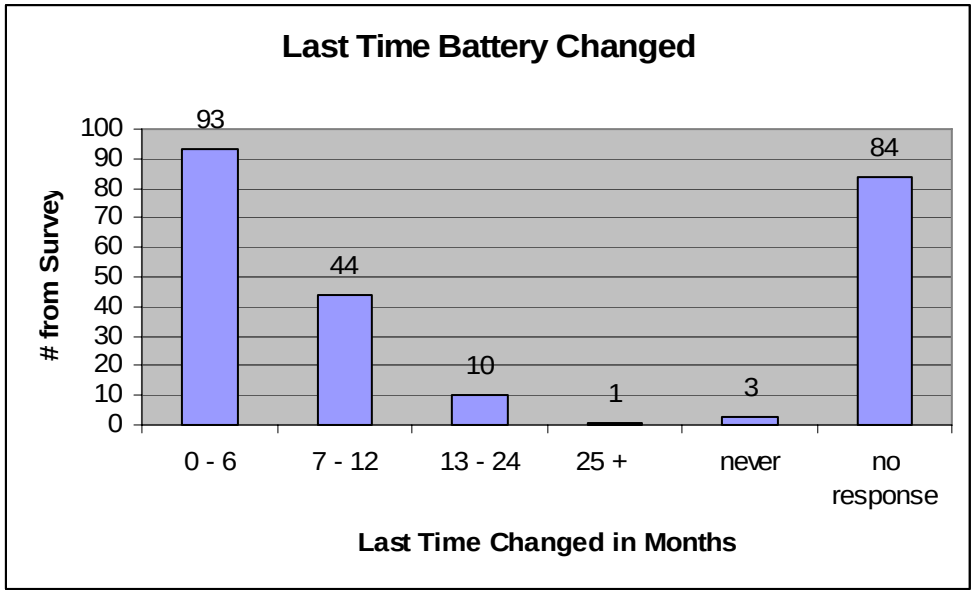

Chart 4